



TITLE:

**SPECIFICATION FOR
AUTOMATIC HIGH VOLTAGE
AC TEST SET**

Doc. No.

KP1/3CB/TSP/09/052

Issue No.

1

Revision No.

0

Date of Issue

2014-02-18

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ANNEX A: *Guaranteed Technical Particulars (to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues/brochures, drawings, technical data, sales records for previous five years, four customer reference letters, details of manufacturing capacity, the manufacturer's experience and copies of complete test reports together with a copy of the accreditation certificate to ISO/IEC 17025 for the third party testing laboratory for tender evaluation, all in English Language)*

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0.1 Circulation List

COPY NO.	COPY HOLDER
1	Research & Development Manager
2	Supply Chain Manager - Procurement
3	Electrical Plant Projects
Electronic copy (pdf) on Kenya Power server (currently: Network→stima-fprnt-001→techstd&specs)	

0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue 1 Rev 0	2014-02-18	Original	M. Apao 	S. Kimita

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FOREWORD

This specification has been prepared by the Electrical Plant Projects Section in collaboration with Research and Development Department both of The Kenya Power and Lighting Company Limited (abbreviated as KPLC) and it lays down requirements for Automatic High Voltage AC Test Set. It is intended for use by KPLC in purchasing the items.

The bidder shall submit information which confirms satisfactory service experience of the manufacturer with products which fall within the scope of this specification.

1. SCOPE

- 1.1 The specification is for a fully automated High Voltage Alternating current test set.
- 1.2 This instrument shall be used for complete field testing of MV and HV Switch gears, HT Cables, Transformers, Insulators, Surge arresters, and Generators to ascertain their insulation integrity and dielectric strength status before energizing the plant.
- 1.3 The field test is paramount after Switchgear and Insulators' installation to ascertain their overvoltage withstand capability.
- 1.4 The instrument shall be used to carry out High Voltage AC proof test and High Voltage insulation resistance test on electrical plants.
- 1.5 The instrument shall be capable of field testing insulation resistance of Transformers and insulators.
- 1.6 The leakage current and insulation resistance tests shall reduce the outage time during commissioning, since the quality of electrical power plant is checked before putting it into service.

2. REFERENCES

N/A

3. TERMS AND DEFINITIONS

N/A

4. REQUIREMENTS

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4.1 Construction

- 4.1.1 The instrument shall be a rugged single unit comprising the Control and HV Modules in a single unit. It shall comply with relevant international standards.
- 4.1.2 The instrument shall be portable; rugged, light weight, shock proof and suitable for use in harsh field conditions.
- 4.1.3 The tester shall be fully automated, intelligent and of high accuracy.
- 4.1.4 The power supply for the instrument shall be 220-230Vac/ 50 Hz.

4.2 Operation

- 4.2.1 The equipment shall be supplied complete with a branded Laptop from a reputable manufacturer.
- 4.2.2 Its operating system shall run on windows10, and capable of being integrated with other diagnostic and data management software.
- 4.2.3 The machine shall be self-calibrating and diagnosing, with no internal circuitry setup required.
- 4.2.4 It shall have built-in timer for predetermining testing time with selectable automatic shutdown.
- 4.2.5 All operating commands shall be by key pad, remote laptop or push button, no panel switches.
- 4.2.6 The instrument shall have built-in automatic discharge circuit and Safety zero start interlock for HV output.
- 4.2.7 The test set shall have a complete internal guard circuit for suppressing stray surface leakage current.
- 4.2.8 The instrument shall be sensitive to microampere in order to measure health insulation.
- 4.2.9 The equipment shall have test procedures that are easy and simple to follow.
- 4.2.10 The instrument shall be supplied with most recent software for easy operation and data analysis. The software shall not require license renewals by KPLC.

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4.3 Test results

- 4.3.1 Display shall be a back light LCD Screen or Current meter, Voltmeter, Megohmmeter and or laptop via communication serial port.
- 4.3.2 The instrument shall have built-in storage capability and data communication interface via USB or RS-232C port to a laptop and Printer.
- 4.3.3 The instrument shall be capable of printing the test result by use of in-built printer or external printer via communication interface.
- 4.3.4 The instrument shall display the test results both in alphanumeric and graphically.

4.4 TECHNICAL AND SPECIFIC REQUIREMENTS

4.4.1 Specific requirements

- 4.4.1.1 The test set shall be capable of carrying out the following field tests on Switchgears, HT cables, Transformers, Insulators Surge diverters and Generators.

- i) Dielectric strength i.e. High Voltage AC proof test.
- ii) Insulation resistance i.e. High voltage Megohm test.

4.4.2 Technical Specifications

ITEM NO.	TECHNICAL DESCRIPTION	KPLC TECHNICAL REQUIREMENTS
1	Physical features	a) Single unit which is Portable, Compact and rugged. b) Weight $\leq$ 50kgs
2	Operation mode	Auto / manually selectable
3	Surge and transit protection	In-built
4	Preset timer (0-30min)	In-built auto shutdown
5	Display	Ammeter, Voltmeter, LCD screen and Megohmmeter or Laptop
6	Guard circuit	In-built
7	Discharge circuit	Internal

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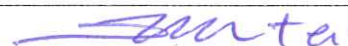
8	Zero start interlock	Must provide
9	Meter protection	Specify
10	Protection against internal surge /test sample breakdown	Specify
11	Output voltage Accuracy	0 to $\geq 95\text{KVAc}$ $\pm 2\%$
12	Duty	1KVAc continuous
13	Output Current Accuracy Resolution	$\geq 30\text{mA}$ $\pm 2\%$ 0.1 μA
14	Voltmeter	3.5" Dual range- Scaled 0- $\geq 80\text{KVAc}$ -F.S
15	Ammeter	3.5" 0 - $\geq 30\text{mA}$; Scale 0.1 μA - F.S
16	Megohmmeter	100 Ω – 1T Ω
17	In Put Power	220-230Vac /50Hz
18	Printer/ Computer interface	RS-232C and or USB port
19	PC Software Features	Recent Version of Software running on Windows 10. Graphic display, Numerical report and Data base utility.
20	Laptop	Branded Intel core i7 running on window 10
21	Test result storage	Can store at least 70 Test results
22	Calibration	Self-calibration and diagnosing
23	Standards	Meets IEC/IEEE /Equivalent
24	Warranty on parts and Labor	At least 12 months
25	Guarantee	Minimum of 5years
26	Operating temperature	-10 $^{\circ}\text{C}$ to 50 $^{\circ}\text{C}$
27	Relative humidity	0 to 90%. Non-condensing
28	Calibration certificate	Certificate from accredited international laboratory valid for at least 2yrs
29	Operation and HV Vac testing manual	At least two manuals in English language.
30	Installation	At KPLC chosen location
31	Factory Acceptance Certification and Training	Two Engineers at manufacturers' factory.

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NB: This schedule does not in any way substitute for detailed information required elsewhere in the specification.

4.4.3 Accessories

The supplier shall provide all the necessary accessories for operation and communication interface, they shall include but not limited to;

- 1) Input power cord (2m long) complete with plug (to Kenya Standards).
- 2) Shielded output cable with Alligator clamp (8m long).
- 3) Return lead with Alligator clamp (8m long).
- 4) Ground lead with Alligator clamp (4m long).
- 5) Ground stick with Lead and Clamp (6m long).
- 6) USB and RS-232C interface cable.
- 7) Insulated transport case and a Cable carrying case.

5.0 TEST AND INSPECTION

- 5.1 The Automatic High Voltage AC Test Set shall be tested and inspected to the requirements of this specification. It shall be the responsibility of the supplier to perform or have performed all relevant tests.
- 5.2 Copies of previous test certificates by a third party testing laboratory accredited to ISO/IEC 17025 shall be submitted with the offer for evaluation (all in English Language).
- 5.3 Test reports for the Automatic High Voltage AC Test Set to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods.
- 5.4 On receipt of the Automatic High Voltage AC Test Sets, KPLC will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification. The supplier shall replace without charge to KPLC, any equipment which upon examination, test or use fail to meet any or all of the requirements in the specification.

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- 5.5 The Automated HVAC test set shall be backed by a minimum 12-months factory warranty on parts and Labor.
- 5.6 After tender award Factory Acceptance Test, Inspection and Training at the factory shall be carried out for two KPLC Engineers before delivery of the test set. The two Engineers shall also be trained on the operation and safe usage of the instrument.
- 5.7 KPLC shall meet the cost of Air ticket to the nearest airport and their accommodation. The supplier shall meet the full cost of factory testing and training.
- 5.8 Technical support and software upgrade, where applicable shall be provided free of charge to KPLC for a period of at least 36 months.

6. MARKING, PACKING AND INSTRUCTIONS

- 6.1 The Automatic High Voltage AC Test Set shall be supplied packed in such a manner so as to protect it from damage during transportation, handling and storage and as required in this specification.
- 6.2 Detailed installation and operating instructions and manuals (all in English language) shall be submitted with the bid for evaluation and also during delivery of the Automatic High Voltage AC Test Set.
- 6.3 The following information shall be marked indelibly and legibly on each Automatic High Voltage AC Test Set:
- Manufacturer's name or trademark and type designation;
 - Ratings
 - Instructions/Caution

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ANNEX A: Guaranteed Technical Particulars (to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, four customer reference letters, details of manufacturing capacity, the manufacturer's experience and copies of complete test reports for tender evaluation, all in English Language)

Tender No. BIDDER'S NAME & ADDRESS

Clause number/Requirement	Bidder's offer (indicate full details of the offered equipment for each requirement of the specification)
Manufacturer's name & Address	
Type Reference /Model Number of offered equipment	
Manufacturer's Authorization	
1. SCOPE	
1.1	
1.2	
1.3	
1.4	
1.5	
1.6	
4. REQUIREMENTS	
4.1 Construction	
4.1.1	
4.1.2	
4.1.3	
4.1.4	
4.2. Operation	
4.2.1.	
4.2.2	
4.2.3	
4.2.4	
4.2.5	
4.2.6	
4.2.7	
4.2.8	
4.2.9	
4.2.10	
4.3 Test Results	
4.3.1	
4.3.2	

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Clause number/Requirement	Bidder's offer (indicate full details of the offered equipment for each requirement of the specification)
4.3.3	
4.3.4	
4.4 Technical & Specific Requirements	
4.4.1 Specific Requirements	
4.4.4.1	
4.4.2 Technical Specification	
Physical features	
Operation mode	
Surge and transit protection	
Preset timer (0-30min)	
Display	
Guard circuit	
Discharge circuit	
Zero start interlock	
Meter protection	
Protection against internal surge /test sample breakdown	
Output voltage	
Accuracy	
Duty	
Output Current	
Accuracy	
Resolution	
Voltmeter	
Ammeter	
Megohmmeter	
In Put Power	
Printer/ Computer interface	
PC Software	
Features	
Laptop	
Test result storage	
Calibration	
Standards	
Warranty on parts and Labor	
Guarantee	
Operating temperature	
Relative humidity	

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Clause number/Requirement	Bidder's offer (indicate full details of the offered equipment for each requirement of the specification)
Calibration certificate	
Operation and HV Vac testing manual	
Installation	
Factory Acceptance Testing and Training	
4.4.3 Accessories	
5. TESTS & INSPECTION	
5.1	
5.2	
5.3	
5.4	
5.5	
5.6	
5.7	
5.8	
6.MARKING, PACKING AND INSTRUCTIONS	
6.1	
6.2	
6.3	

.....
Manufacturer's Name, Signature, Stamp and Date

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